■Version upgrade information

Following information is changed specification points by software version up (Ver. V128 → V130, V132).
The software version can be checked by the "CPU1 version" of status monitor. Refer to "8.1 Screen display of [Monitor mode]" of VF-AS3 Instruction Manual (E6582062).
The software version would be changed without preliminary announcement.

Added parameters

Title	Communication No.	Description	Software version	*Instruction manual reference
F106	0106	[F106: Opposite direction command during 3-wire running] 0: Enabled （Default setting） 1: Stop ■Function If [F106] is set 1, when you input a command for the opposite direction during 3-wire operation, the motor will stop instead of operating in the opposite direction.	Ver.132 or later	[7.2.1]
F456	0456	Changed the default setting of [F456: Exciting forcing level] for the following models at ND rating. 4550PC ：100 → 95% 4132KPC：100 → 85% 4160KPC：100 → 95% 4200KPC：100 → 85%	Ver.132 or later	[5.3.2] [6.23.1]
C668	C668	Change the default setting of [C668: Emb Eth. Web server] from 1: Enabled to 0: Disabled. 0: Disabled （Default setting） 1: Enabled Note: If the CPU version is Ver132 or later and you are use the Webserver, set [F668] to 1.	Ver.132 or later	E6582125: Embedded Ethernet function
A275 – A279 A287 A288 A289 A677	A275 – A279 A287 A288 A289 A677	Added parameter for manufacturer	Ver.132 or later	-
F111 – F124 F151 – F158 A973 – A976	0111 – 0124 0151 – 0158 A973 – A976	In order to add the following “Setting for manufacturer”, the upper limit of parameters related to input terminal functions has been changed from 203 to 219. 204 - 205：- 206/207 ：Setting for manufacturer 208/209 ：Setting for manufacturer 210 - 219：-	Ver.132 or later	-
AUF	0093	When [AUF: Guidance function] = “1: Embedded Ethernet setting”, "MAC address monitor" was added to the display information of the operation panel. Title: MAC address	Ver.130 or later	[4.2.1]

Title	Communication No.	Description	Software version	*Instruction manual reference
F169 F404 F406 F407 F408 F410 F411 F422	0169 0404 0406 0407 0408 0410 0411 0422	[F169: V/f Pattern 2] 0-9 0: V/f constant 1:- 2: Automatic torque boost 3: Vector control 1 4-8:- 9: Vector control 2 (speed / torque) [F404: 2nd motor automatic torque boost] Adjustment range: 0.01 - 30.00 [Unit: %] [F406: 2nd motor rated capacity] Adjustment range: 0.01 - 315.0 [Unit: kW] [F407: 2nd motor leakage inductance] Adjustment range: 0.0 - 25.0 [Unit: %] [F408: 2nd motor rated current] Adjustment range: Depends on drive capacity [Unit: A] [F410: 2nd motor no load current] Adjustment range: 10 - 90 [Unit: %] [F411: 2nd motor rated speed] Adjustment range: 100 - 64000 [Unit: min^{-1}] [F422: Motor constant select] Extended the range from 2 to 3 Changed the name of the selection 0,1 and 2 0: Use motor1 const. for motor2 1: Use motor2 const. for motor2 2: 0 + special auto-tuning 3: 1 + special auto-tuning ■Function Added V/f Pattern 2 and 2nd motor constant Vector control can also be selected for the second motor.	Ver.130 or later	Information1 Information2
F484 F485	0484 0485	[F484: Load inertia ratio 2] Adjustment range: 0.1 to 100.0 [Unit: Times] [F485: Speed control response select] 0: 2 level spd gain, 2nd gain: F459 1: 2 level spd gain, 2nd gain: F484 2: 4 point setting for speed gain ■Function Added 2nd Load inertia function. Selection of load inertia ratio 2 and auto-tuning of load inertia ratio 2 are possible.	Ver.130 or later	Information3
A687 A688 A689 A690 A691 A694 A695	A687 A688 A689 A690 A691 A694 A695	[A687: Speed control response switching frequency 2] Adjustment range: 0.0 - FH [Unit: Hz] [A688: Speed control response switching frequency 3] Adjustment range: 0.0 - FH [Unit: Hz] [A689: Speed control response switching frequency 4] Adjustment range: 0.0 - FH [Unit: Hz] [A690: Load inertia ratio 3] Adjustment range: 0.1 - 100.0 [Unit: Times] [A691: Speed control response 3] Adjustment range: 0.1 - 25.0 [Unit: -] [A694: Load inertia ratio 4] Adjustment range: 0.1 - 100.0 [Unit: Times] [A695: Speed control response 4] Adjustment range: 0.1 - 25.0 [Unit: -] ■Function Added the point conversion function to speed control gain	Ver.130 or later	Information4

Title	Communication No.	Description	Software version	*Instruction manual reference
F436 F437 F438 F439	0436 0437 0438 0439	[F436: Torque limit point frequency 1] Adjustment range: 0.0 - FH [Unit: Hz] [F437: Torque limit point frequency 2] Adjustment range: 0.0 - FH [Unit: Hz] [F438: Torque limit point frequency 3] Adjustment range: 0.0 - FH [Unit: Hz] [F439: Torque limit point frequency 4] Adjustment range: 0.0 - FH [Unit: Hz] ■Function Added point conversion function to torque limit	Ver.130 or later	Information5
A986 A987 A988 A989	A986 A987 A988 A989	[A986: Analog input function target 31] Adjustment range: 0 to 6 [A987: Analog function setting destination 31] Adjustment range: 0 to 23 [A988: Analog input function target 41] Adjustment range: 0 to 6 [A989: Analog function setting destination 41] Adjustment range: 0 to 23 ■Function Added channel 3,4 to analog My function	Ver.130 or later	E6582114: My function manual
A691 A694	A691 A694	[A961: Analog function setting destination 11] [A964: Analog function setting destination 21] Added function to selection 12 of [A961] and [A964] 12: Load inertia ratio (F459)	Ver.130 or later	E6582114: My function manual
F701	0701	[F701: Current, voltage units select] Added function to selection 2,3 (selection of parameter for manufacturer) of [F701] 2,3：-	Ver.130 or later	[5.2.7]
F789	0789	Added parameter for manufacturer	Ver.130 or later	-
A678	A678	Added parameter for manufacturer	Ver.130 or later	-

*Refer to「VF-AS3 Instruction manual」(E6582062)

*Information1: Switching two to four types of motor characteristics

■ Function

These parameters are used for setting when you want to switch up to four types of motors for a single inverter or when you want to switch the motor V/f characteristics (four types) according to the purpose or operation style.
V/f1-V/f4 are switched by the input terminal signals.

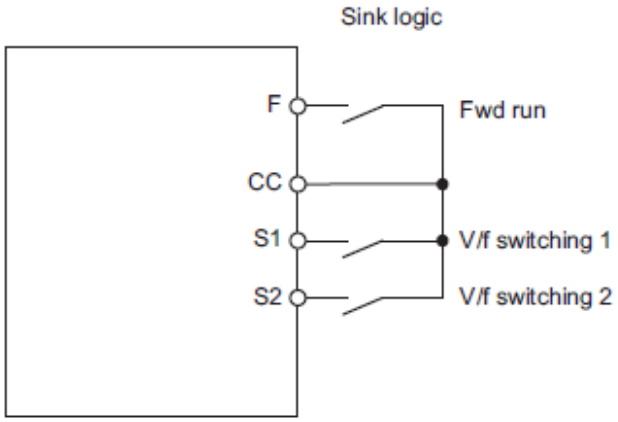
Memo

- [Pt: V/f Pattern 1] is valid only for V/f1, and [F169: V/f Pattern 2] is valid only for V/f2.
  When V/f3 or V/f4 is selected, V/f pattern is V/f constant mode.
- For the parameters that are selected when V/f1-V/f4 are switched, refer to the following table.

■ Switch terminal setting

As default setting, V/f1-V/f4 switching functions are not assigned to the input terminals. Assign the functions to unused input terminals.

Example: When "28: V/f switching 1" is assigned to terminal [S1], and "30: V/f switching 2" to terminal [S2].



Input terminal		Parameters to be selected	V/f	Output terminal (function number)	
S1-CC	S2-CC			No.186	No.188
OFF	OFF	Base frequency 1: [vL] Base frequency voltage 1: [vLv] Manual torque boost 1: [vb] Motor overload protection current 1: [tHrA] 1st motor parameter *1	1 *3*4 (V/f1)	OFF	OFF
ON	OFF	Base frequency 2: [F170] Base frequency voltage 2: [F171] Manual torque boost 2: [F172] Motor overload protection current 2: [F182] When [F422] = "0", "2": 1st motor parameter *1 When [F422] = "1", "3": 2nd motor parameter *2	2 *4 (V/f2)	ON	OFF
OFF	ON	Base frequency 3: [F174] Base frequency voltage 3: [F175] Manual torque boost 3: [F176] Motor overload protection current 3: [F183] 1st motor parameter *1	3 *5 (V/f3)	OFF	ON
ON	ON	Base frequency 4: [F178] Base frequency voltage 4: [F179] Manual torque boost 4: [F180] Motor overload protection current 4: [F184] 1st motor parameter *1	4 *5 (V/f4)	ON	ON

*1 1st motor parameter: [F402], [F405], [F412], [F415], [F416], [F417]

*2 2nd motor parameter: [F404], [F406], [F407], [F408], [F410], [F411]

Regarding [F422] setting, refer to the [Information2]

*3 When you want to use [Pt] of "1", "4" - "8", or "10" - "12", select V/f1.

*4 When you want to use [Pt] of "2", "3", or "9", select V/f1 or V/f2.

*5 When you select V/f3 or V/f4, V/f is assumed to be constant (control equivalent to control with [Pt] = "0").

- Be sure to perform V/f switching in the stop state. Switching is impossible during run. It takes 0.2 seconds before switching. Therefore, be sure to wait at least 0.2 seconds after inputting a switching signal, and then start operation.
- When you use an input terminal where a variety of functions can be assigned, you can link the switching of torque limit or acceleration/deceleration time to V/f switching.

For operation panel run, you can also set the acceleration/deceleration time for [F504: Panel Acc/Dec select].

* Information2: Setting motor parameters

1) Parameter setting

Title	Parameter name	Adjustment range	Default setting
F400	Offline auto-tuning	0: - 1: Reset motor parameters (0 after execution) 2: Auto-tuning at run command (0 after execution)*1 3: Auto-tuning at TB ON*1 (0 after execution) 4: Motor parameters auto calculation (0 after execution) 5: 4+2 (0 after execution) 6: Auto-tuning at run command during TB ON*1 7: Auto-tuning F402 only at run command during TB ON 8: Auto-tuning at TB on each time 9: Auto-tuning at run command (only one time after power on)	0
F422	Motor constant select	0: Use 1st motor parameter for 2nd motor, Standard auto-tuning 1: Use 2nd motor parameter for 2nd motor, Standard auto-tuning 2: Use 1st motor parameter for 2nd motor, Special auto-tuning 3: Use 2nd motor parameter for 2nd motor, Special auto-tuning	0

*1 When auto-tuning the 2nd motor, it is necessary to set [F422]="1" or "3".

*2 The parameters to be tuned are different between standard and special auto tuning.

Refer to "2) Selecting auto-tuning setting".

2) Selecting auto-tuning setting

1: Reset motor parameters (0 after execution)

Set motor parameters [F402: Automatic torque boost], [F412: Leakage inductance], and [F416: Motor no load current] to default setting values (motor parameter values of a 4P Toshiba IE3 motor which has the same capacity as the inverter's applicable motor capacity.

2: Auto-tuning at run command (0 after execution)

An auto-tuning is performed when the motor starts for the first time after settings are made and the motor parameters[*1] are automatically set with the motor wiring considered.

3: Auto-tuning at TB ON (0 after execution)

Assign "66: Offline auto-tuning (67 is the inversion signal)" to the digital input terminal.
When that input terminal is turned ON, an auto-tuning is performed. The motor parameters[*1] are automatically set.
This setting allows an auto-tuning while the motor is stopped; use this function when the motor cannot start operation directly after the auto-tuning due to some reason related to the operation of the machinery.
However, if the standby signal is OFF, this function will not be enabled.
To make an auto-tuning again, turn the input terminal OFF and set [F400] to "3" first and then turn the terminal ON again.

4: Motor parameters auto calculation (0 after execution)

Execute motor parameters auto calculation.

5: 4+2 (0 after execution)

Execute "4: Motor parameters auto calculation". "2: Auto-tuning at run command" is set.
When the motor starts for the first time after settings are made, an auto-tuning is executed.

6: Auto-tuning at run command during TB ON

Assign "66: Offline auto-tuning (67 is the inversion signal)" to the digital input terminal.
While that input terminal is ON, an auto-tuning is always performed at startup. The motor parameters[*1] are automatically set.

7: Auto-tuning F402 only at run command during TB ON

Assign "66: Offline auto-tuning (67 is the inversion signal)" to the digital input terminal.
While that input terminal is ON, an auto-tuning is always performed at startup. Only [F402: Automatic torque boost] is set.

8: Auto-tuning at TB on each time

Assign "66: Offline auto-tuning (67 is an inverted signal)" to the digital input terminal.
By only turning on the assigned input terminal, the auto-tuning automatically executes every time and sets the motor parameters[*1].

9: Auto-tuning at run command (only one time after power on)

When the power is turned off after setting and when the power is turned on again for the first time, the auto-tuning automatically executes 1 time and sets the motor parameters*1.

*1 Tuned motor parameters by [F400] = "2", "3", "6", "8",and "9".

[F422] setting	Motor constant to be tuned	[F422] setting	Motor constant tuned when the second motor is selected
0	[F402: Automatic torque boost] [F412: Leakage inductance]	1	[F404: 2nd Motor Automatic torque boost] [F407: 2nd Motor Leakage inductance]
2	[F402: Automatic torque boost] [F412: Leakage inductance] [F416: Motor no load current] [F417: Motor rated speed]	3	[F404: 2nd Motor Automatic torque boost] [F407: 2nd Motor Leakage inductance] [F410: 2nd Motor no load current] [F411: 2nd Motor rated speed]

If [F422] = "1" or "3" is set and 1st/3rd/4th motor is selected, the motor constant for 1st motor will be tuned.

* Information3: Speed gain adjustment

You can adjust speed gain as below to set [F485].

Title	Communication No.	Parameter name	Adjustment range	Default setting	Write during Running*1
F485	0485	Speed control response select	0: F466 enabled and use F459 in 2nd gain 1: F466 enabled and use F484 in 2nd gain 2: 4-point of speed control gain	0	N

*1: Y: Writable N: Not writable

■ **Use Load inertia ratio 2**

1) How to switch speed control gains

In case [F485]="1", load inertia ratio is switched as well as Speed control response, Speed control stabilization coefficient, Speed reference filter coefficient at speed gain switching.

(1) To switch the gain by the parameter

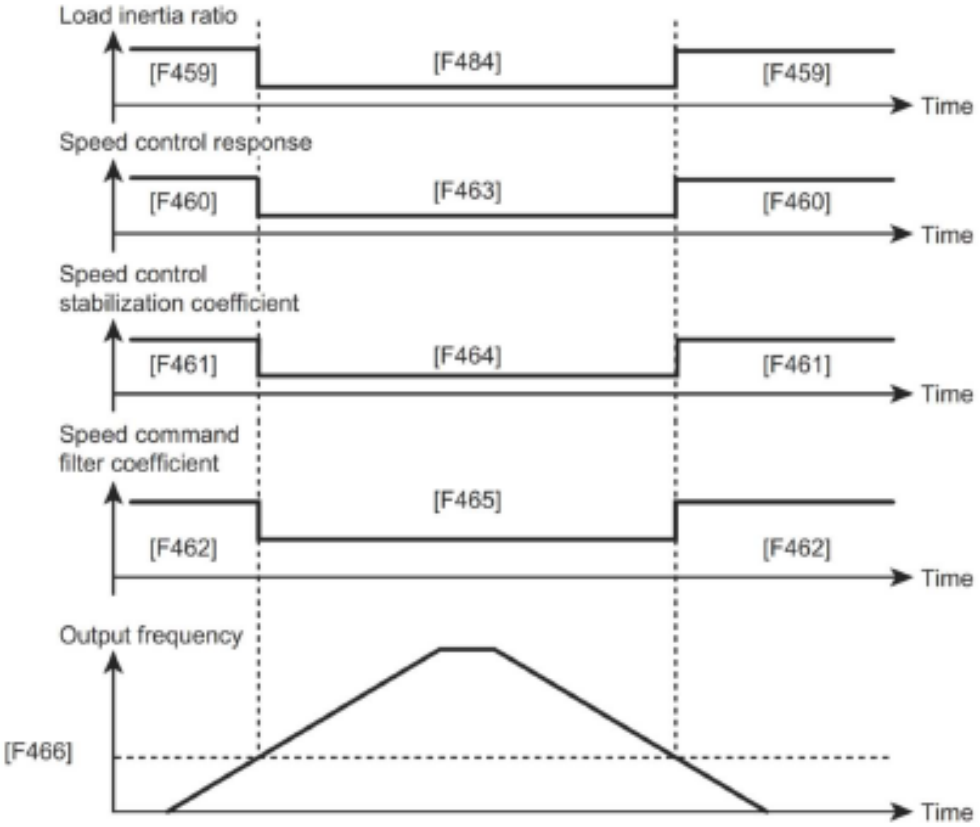
During high-speed or low-speed operation, you need to change the speed control gain before adjusting it in some cases for reasons of machine characteristics. In this case, use the gain switching.
Gains are switched according to the setting frequency in [F466] as shown in the following figure. When [F466] = "0.0", the speed control gain switching is disabled. Speed control gain 1 is enabled.

[F459: Load inertia ratio 1]
[F460: Speed control response 1]
[F461: Speed control stabilization coefficient 1]
[F462: Speed reference filter coefficient 1]

Speed control gain 1

[F484: Load inertia ratio 2]
[F463: Speed control response 2]
[F464: Speed control stabilization coefficient 2]
[F465: Speed reference filter coefficient 2]
[F466: Speed control response switching frequency 1]

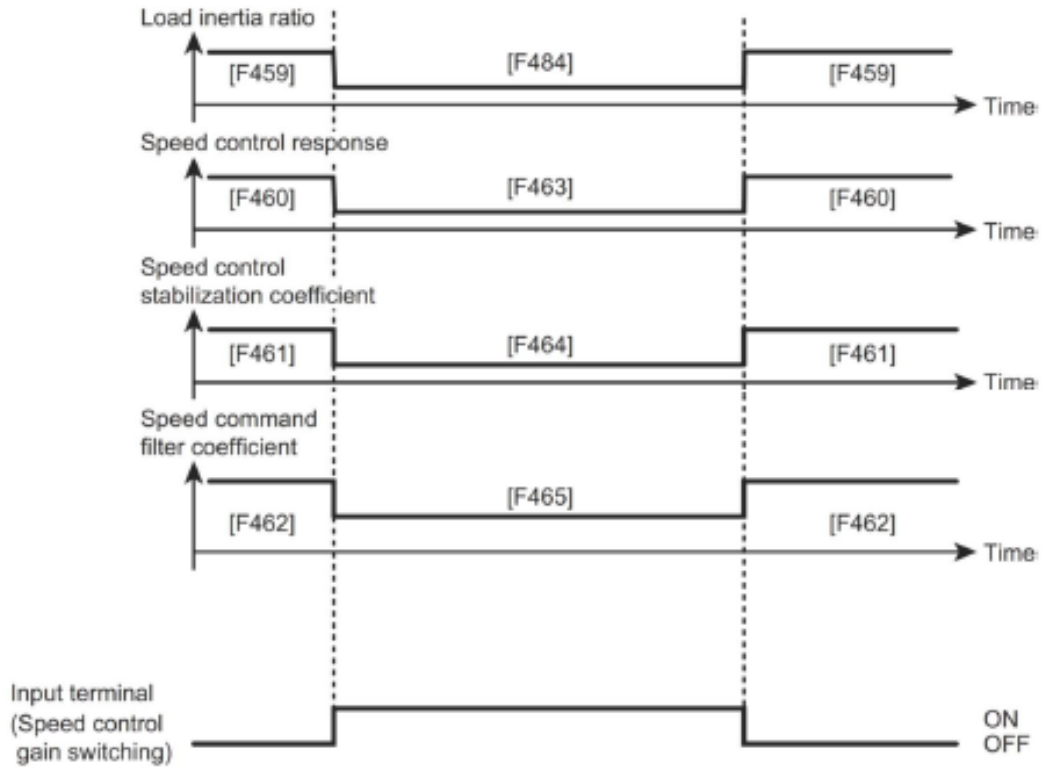
Speed control gain 2



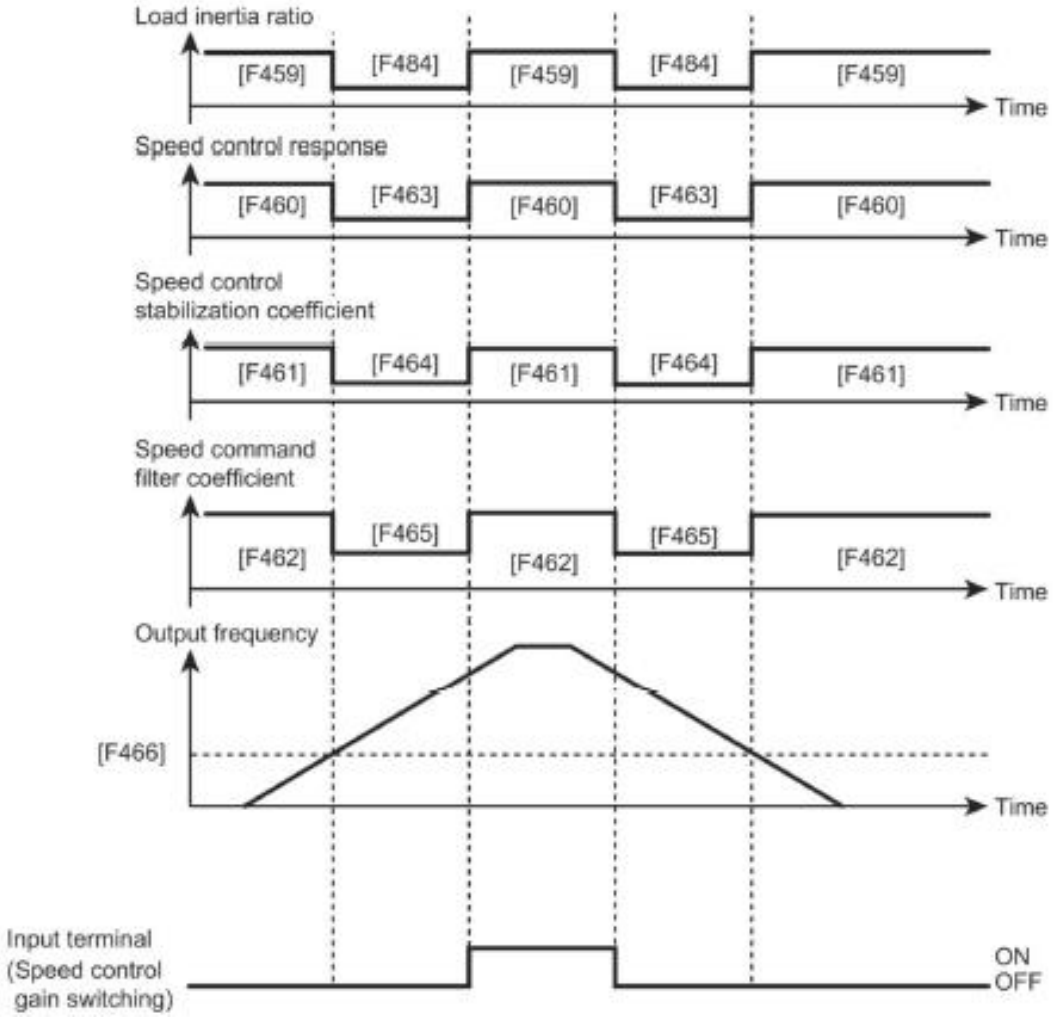
In a range where the output frequency is [F466] or less, [F460], [F461], and [F462] are enabled. In a range where the output frequency is over [F466], [F463], [F464], and [F465] are enabled.

(2) To switch gains by the input terminal

Use the input terminal "68: Speed control gain switching" to switch between speed control gain 1 and speed control gain 2. Gains are switched according to the input terminal signal as shown in the following figure.



By using [F466] together with the speed gain switching by the input terminal, you can switch between speed control gain 1 and speed control gain 2.
Gains are switched by the output frequency and the input terminal signal.



2) Auto tuning for [459: Load inertia ratio 1], [F484: Load inertia ratio 2]

In case [F485] = "1", the auto tuning for Load inertia 1 and Load inertia 2 can be operated separately.
In case you want to tune [F459: Load inertia ratio 1], execute load inertia auto tuning with input terminal "68: Speed control gain switching" = OFF.
In case you want to tune [F484: Load inertia ratio 2], execute load inertia auto tuning with input terminal "68: Speed control gain switching" = ON.

In case [F485] = "0", only [F459: Load inertia ratio 1] can be auto tuned. In case [F485] = "2", load inertia ratio auto tuning is not available.

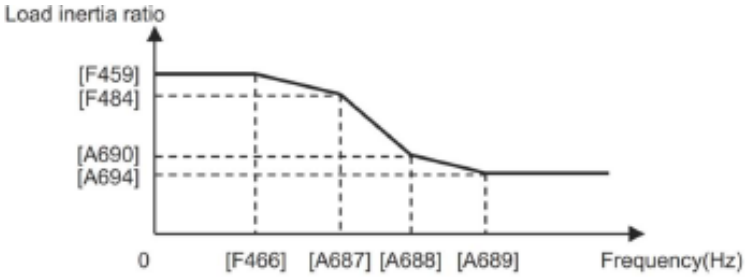
* Information4: The point change of speed control gains

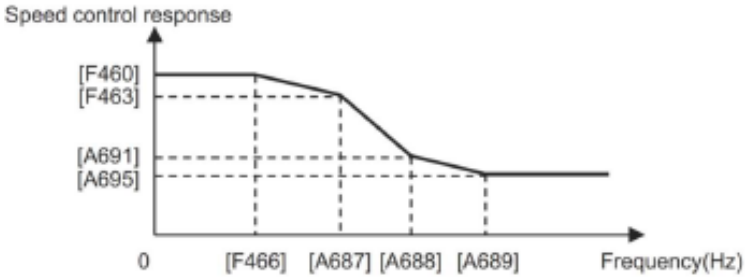
■ **The point change of speed control gains**

In case [F485] = "2", you can set frequency characteristic for load inertia ratio, and speed control response with 4 points linear interpolation as below.

Title	Communication No.	Parameter name	Adjustment range	Default setting	Write during Running*1
F466	0466	Speed control response switching frequency 1	0.0 - FH (Hz)	0.0	Y
A687	A687	Speed control response switching frequency 2	0.0 - FH (Hz)	0.0	Y
A688	A688	Speed control response switching frequency 3	0.0 - FH (Hz)	0.0	Y
A689	A689	Speed control response switching frequency 4	0.0 - FH (Hz)	0.0	Y
F459	0459	Load inertia ratio 1	0.1 - 100.0	1.0	Y
F484	0484	Load inertia ratio 2	0.1 - 100.0	1.0	Y
A690	A690	Load inertia ratio 3	0.1 - 100.0	1.0	Y
A691	A691	Load inertia ratio 4	0.1 - 100.0	1.0	Y
F460	0460	Speed control response 1	0.0 - 25.0	0.0	Y
F463	0463	Speed control response 2	0.0 - 25.0	0.0	Y
A694	A694	Speed control response 3	0.1 - 25.0	1.0	Y
A695	A695	Speed control response 4	0.1 - 25.0	1.0	Y

*1: Y: Writable N: Not writable





- The points Speed control response switching frequency ([F466], [A687] to [A689]) is set to "0" are invalid.
- Do not set same value without 0Hz to more than 2 parameters of Speed control response switching frequency ([F466], [A687] to [A689]). If do so, "A-07" alarm is displayed to LED panel.
- The points speed control response ([F460], [F463]) is set to "0.0" are invalid.
- In case all 4 points are invalid, speed response gain 1 is valid.

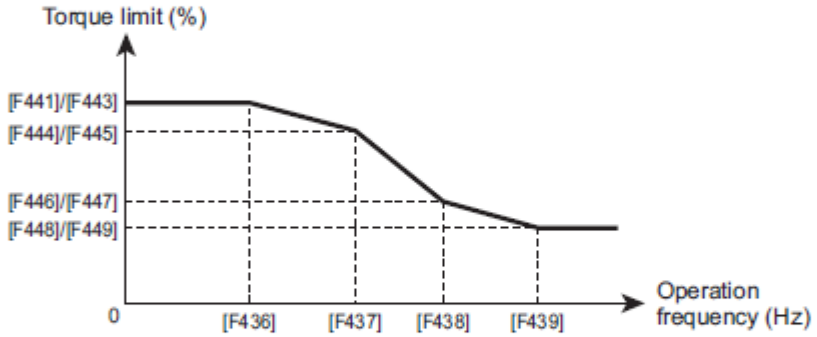
About Speed control stabilization coefficient, and Speed reference filter coefficient, [F461], [F462] are valid respectively.
The input terminal "68: Speed control gain switching" is not available.

* Information5: Switching between torque limit levels

When torque limits are applied with the run frequency

You can switch between torque limit levels 1 to 4 with the run frequency.

Title	Parameter name	Adjustment range	Unit	Default setting
F436	Torque limit point frequency 1	0.0 - FH	Hz	0.0
F437	Torque limit point frequency 2	0.0 - FH		0.0
F438	Torque limit point frequency 3	0.0 - FH		0.0
F439	Torque limit point frequency 4	0.0 - FH		0.0



Set four points, (F436, F441/F443), (F437, F444/F445), (F438, F446/F447), and (F439, F448/F449). You can change the torque limit level with the run frequency.

Memo

If multiple values other than 0 Hz are set for [F436] - [F439], the "A-08" alarm appears and only the value with the smallest parameter number becomes effective.
Of [F436] - [F439], any points for which 0 Hz is set are ineffective.
If 250% is set for a torque limit at at least one of the effective points on the power running side, a torque limit of 250% applies to all speed areas on the power running side.
This is also true of the regenerating side. If 250% is set at at least one point, a torque limit of 250% applies to all speed areas on the regenerating side.

Errata sheet

Instruction manual	Page	Content
“Pump control function Manual” (E6582124③)	30	9. Combination with Sleep function (Note) When [A200] = “2”, the sleep function cannot be used regardless of the [A213] setting. Error - Sleep function can not be used in case these 2 conditions are both satisfied. (in this case, not recovering from sleep state.) [A200] = “2” [A213] = “0” Correct - The sleep function cannot be used when [A200] = “2”. (in this case, not recovering from sleep state.)

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